AKDENIZ UNIVERSITY

Computer Engineering Department

CSE 211 Digital Design (2024-2025 Fall)

Lab05 – Combinational Logic – 16.12.2024

	Student No	Student Full Name	Group No
1			
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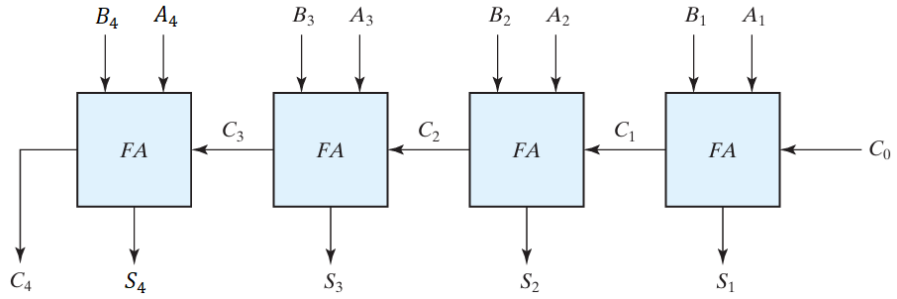
Lab Study 1 – *4-bit Adder*

Design and test a 4-bit binary adder circuit using the 74LS83 IC. Understand functionality of the binary addition and carry propagation through a practical implementation. Fill the truth table for 4 different 4-bit binary summing operation. (C0 should be connected to ground)



$$\begin{array}{r} A_4A_3A_2A_1 \\ +\ B_4B_3B_2B_1 \\ \hline C_4S_4S_3S_2S_1 \end{array}$$

Figure 1: 4-Bit Adder

4-Bit Adder Truth Table (Fill the table for only 4 different 4-bit adding operation)

C_0	A_4	A_3	A_2	A_1	B_4	B_3	B_2	B_1	C_4	S_4	S_3	S_2	S_1
0													
0													
0													
0													

Lab Study 2 – *8x1 Multiplexer*

Design 8x1 multiplexer circuit by using 74LS151 IC for data selection task.

Steps:

1. Circuit Setup
   - Connect 8 input switches to D0–D7, representing data inputs.
   - Connect **select lines** (S0, S1, S2) to three separate switches.
   - Attach LEDs to Y and Y'(W) to observe the selected output and its complement.
2. Input Test Cases
   - Apply different binary combinations to the select lines (S0, S1, S2).
   - Verify that the output corresponds to the selected input line.
   - Fill out the truth table below.

$Strobe$	S_0	S_1	S_2	D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7	Y	W
	0	0	0										
	0	0	1										
	0	1	0										
	0	1	1										
	1	0	0										
	1	0	1										
	1	1	0										
	1	1	1										

IC Pinouts

74LS83	74LS151